

Claims

1. Apparatus for facilitating sealing of a puncture formed in a proximal lateral surface of a vessel, the apparatus comprising:
 - a bar having proximal and distal ends and a first bore extending laterally therethrough; and
 - a filament disposed through the first bore,wherein the bar is configured to apply a compressive force upon a distal lateral surface of a vessel.
2. The apparatus of claim 1 further comprising a delivery sheath having proximal and distal ends, a lumen extending therebetween and a sharpened tip at the distal end, wherein the lumen is configured to contain the bar and filament.
3. The apparatus of claim 2 further comprising a push rod disposed in the lumen proximal of the bar.
4. The apparatus of claim 1, 2 or 3 wherein the bar has a shape chosen from the group consisting of cylindrical shapes, rectangular shapes, and oval shapes.
5. The apparatus of claim 1, 2, 3 or 4 wherein the bar comprises a biodegradable material.
6. The apparatus of claim 1, 2, 3, 4 or 5 further comprising a tensioning device configured to hold the filament in a tensioned state.
7. The apparatus of claim 6 wherein the tensioning device comprises:

an upright having upper and lower ends;
a plurality of legs attached to the lower
end; and
a grip affixed to the upper end.

8. The apparatus of claim 7 wherein the grip comprises a V-shaped groove formed in an elastomeric material.

9. The apparatus of any one of claims 1 to 8 wherein the first bore is disposed in a central region of the bar.

10. The apparatus of any one of claims 1 to 9 further comprising an eyelet coupled to the bar, wherein the filament is disposed through both the first bore and the eyelet.

11. The apparatus of claim 10 wherein the first bore is disposed in a central region of the bar, and the eyelet is coupled to a distal region of the bar.

12. The apparatus of claim 10 or 11 further comprising an eyelet coupled to the bar, wherein the eyelet is coupled to a central region of the bar, and the first bore is disposed in a distal region of the bar.

13. The apparatus of any one of claims 1 to 12 further comprising a second bore extending laterally through the bar, wherein the filament is disposed through both the first bore and the second bore.

14. The apparatus of claim 13 wherein the first bore is disposed in a central region of the bar, and the second bore is disposed in a distal region of the bar.

15. Apparatus for facilitating sealing of a puncture formed in a proximal lateral surface of a vessel, the apparatus comprising:

a bar having proximal and distal ends and a first eyelet coupled to the bar; and

a filament disposed through the first eyelet,

wherein the bar is configured to apply a compressive force upon a distal lateral surface of a vessel.

16. The apparatus of claim 15 wherein the first eyelet is coupled to a central region of the bar.

17. The apparatus of claim 15 or 16 wherein the bar further comprises a second eyelet coupled to the bar, wherein the filament is disposed through the first eyelet and the second eyelet.

18. The apparatus of claim 17 wherein the first eyelet is coupled to a central region of the bar, and the second eyelet is coupled to a distal region of the bar.

19. The apparatus of claim 15, 16, 17 or 18 further comprising a delivery sheath having proximal and distal ends, a lumen extending therebetween and a sharpened tip at the distal end, wherein the lumen is configured to contain the bar and filament.

20. The apparatus of claim 19 further comprising a push rod disposed in the lumen of the delivery sheath proximal of the bar.

21. The apparatus of any one of claims 15 to 20 wherein the bar comprises a biodegradable material.

22. The apparatus of any one of claims 15 to 21 further comprising a tensioning device configured to hold the filament in a tensioned state.

23. Apparatus for facilitating sealing of a puncture formed in a proximal lateral surface of a vessel, the apparatus comprising:

a body having proximal and distal ends and a first tube extending from the distal end of the body; and

a first wire having proximal and distal ends and a sharpened tip at the distal end, wherein the distal end of the first wire is configured for constraint within the first tube in a contracted state, and further configured to self-deploy to a predetermined shape in a deployed state when the distal end is no longer constrained within the first tube,

wherein the first wire is configured to engage tissue distal of a distal lateral surface of the vessel to apply a compressive force thereto.

24. The apparatus of claim 23 wherein the first wire comprises a shape-memory material.

25. The apparatus of claim 23 or 24 wherein the first tube comprises a first needle, the apparatus further comprising:

a second needle extending from the distal end of the body; and

a second wire having proximal and distal ends and a sharpened tip at the distal end, the second

wire having a contracted state configured for constraint within the second needle, and a deployed state.

26. The apparatus of claim 25 wherein the sharpened tip of the first wire is configured to deploy in a direction opposing a direction of the sharpened tip of the second wire when deployed.

27. The apparatus of claim 25 or 26 wherein the first needle is adapted to pierce tissue on a first lateral side of the vessel and the second needle is adapted to pierce tissue on a second lateral side of the vessel.

28. The apparatus of claim 27 wherein the body further comprises a centering shaft adapted for placement within a puncture tract extending through tissue to the puncture, thereby facilitating proper positioning of the first and second needles on the first and second lateral sides of the vessel, respectively.

29. Apparatus for facilitating sealing of a puncture formed in a proximal lateral surface of a vessel, the apparatus comprising:

a delivery sheath having proximal and distal ends and a first lumen extending therebetween; and

a first wire having proximal and distal ends and a sharpened tip at the distal end, wherein the distal end of the first wire is configured for constraint within the first lumen of the delivery sheath in a contracted state, and further configured to self-deploy to a predetermined shape in a deployed state when the distal end is no longer constrained within the delivery sheath,

wherein the first wire is configured to engage tissue distal of a distal lateral surface of the vessel to apply a compressive force thereto.

30. The apparatus of claim 29 wherein the predetermined shape of the first wire comprises a shape chosen from the group consisting of hook shapes, arcuate shapes, arcuate shapes having a radius of curvature larger than a radius of curvature of the vessel, semi-circular shapes, and circular shapes.

31. The apparatus of claim 29 or 30 wherein the delivery sheath is adapted for placement within a puncture tract, wherein the puncture tract extends through tissue to the puncture.

32. The apparatus of claim 29, 30 or 31 wherein the delivery sheath further comprises at least one side port through which the distal end of the first wire may be advanced.

33. The apparatus of claim 29, 30, 31 or 32 further comprising a second wire having proximal and distal ends and a sharpened tip at the distal end, the second wire having a contracted state whereby the second wire is constrained within a second lumen of the delivery sheath, and a deployed state.

34. The apparatus of claim 33 wherein the sharpened tip of the first wire is configured to deploy in a direction opposing a deployed direction of the sharpened tip of the second wire.

35. The apparatus of any one of claims 29 to 34 further comprising a tensioning device configured to hold the first wire in a tensioned state.